

Memorandum

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SUBJECT: **SUMMARY AND COMMENTS ON THE PRELIMINARY BASIN PLAN
AMENDMENT AND TMDL DEVELOPMENT FOR ORGANOCHLORINE
PESTICIDES IN THE CENTRAL VALLEY**

The subject this memorandum is the proposed Amendment to the Central Valley Region Basin Plan to address the need for TMDLs for organochlorine pesticides in several Central Valley water bodies. The purpose is to summarize the meeting conducted on June 17th, 2010, and to identify concerns and provide comments on the preliminary Basin Plan Amendment language and alternatives proposed and discussed at the meeting.

Background, Stakeholder Meeting, June 17

The stakeholder meeting provided a general update on the basis for the TMDLs, the proposed project approach and schedule, and a general discussion of the project scope. The meeting was conducted by Regional Board staff Fred Kizito and Amanda Montgomery.

Materials provided for the meeting included:

- Agenda
- Presentation notes (for the staff PowerPoint presentation)
- Preliminary Partial Basin Plan Amendment (BPA) text
- Supplemental Information for Preliminary BPA Text (Updated June 2010)

The Water Board's approach is to develop and present the elements of the TMDL in 4 sequential independent modules plus an integration module. Comments from stakeholders will be accepted throughout the process, but early comments are encouraged for each module, and will be considered

and/or responded to during the development process. TMDL modules will be considered in the following order.

1. Summary and initial discussion of Project Scope (including Project Areas, Sources, and Alternative Targets)
2. Linkage analysis and allocations
3. Implementation and early action items
4. Compliance Schedule, Monitoring and Surveillance
5. Synthesis/Integration of previous modules

Written comments for the 1st Module presented at the June 17, 2010 meeting are due by July 1st. The remainder of this document presents a summary of the presentation of Module 1, issues raised by the stakeholders in attendance, and provides our comments on target alternatives. The presentation generally followed the preliminary Basin Plan Amendment text, which presented multiple options for the elements of the TMDL, with the staff-preferred option listed first in each case.

Module 1: Project Scope

Background: Water Board staff summarized the regulatory basis for the 303(d) listings and the TMDL.

Project Areas: In the San Joaquin valley, the listed reaches include 6 reaches of the San Joaquin River (from Mendota Pool to the Delta boundary), and several major and lesser tributaries (lower Tuolumne River, lower Stanislaus River, Merced River, Orestimba Creek). The listed reaches include the lower Feather River and Colusa Drain in the Sacramento Valley, and eight regions of the Delta.

Sources: Discussion of sources acknowledged that there was no current legal use of legacy organochlorine pesticides, and that current sources were primarily from historical uses in urban, residential, and agricultural settings. These sources were further categorized as point sources (treated wastewater from residential sources, urban runoff), non-point sources (runoff from agricultural lands), and “background” sources. It was clarified that “background” sources were not considered natural background, but were primarily atmospheric non-point sources (wet and dry deposition of dust, mainly) that were considered uncontrollable for the purpose of the TMDL. *Note: the WARMF model was used to help identify sources and may also be useful in prioritizing sources and management practices, and for allocating loads for the TMDL.*

Potential TMDL Targets: Alternatives for potential TMDL targets were presented for three matrices (water, fish, and sediment). These targets would form the basis for assessing compliance with the TMDL, triggers for additional implementation, and ultimately completion of the TMDL.

Water

The preferred basis identified by Water Board staff for establishing targets for water is a combination of two narrative prohibitions currently in the Basin Plan, and the criteria currently provided in the California Toxics Rule (CTR). The first is a narrative toxicity objective that states, “*No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses.*” The second is the Basin Plan prohibition of “detectable” concentrations (“*...chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by the*

Environmental Protection Agency or the Executive Officer.” The CTR criteria are numeric criteria based on protection of aquatic life, and protection of human health from consumption of water and organisms. Most of the CTR human health-based criteria for OC pesticides are driven by bioaccumulation factors and consumption of fish.

All three of these are part of the preferred option for water-based targets, and preliminary BPA text indicates that the most stringent target would apply in cases where there is more than one target for a specific chemical. There was no alternative basis identified for targets for water.

Comments on Water Concentration Targets:

- The Basin Plan prohibition against detectible concentrations is a technology-based limit and is not linked to protection of beneficial uses. The specific limits are not overly stringent compared to objectives based on beneficial use protection, but they are based on older analytical methods that are obsolete when compared to newer methods and known concentrations of concern. Because available analytical methods and detection capability is always improving, use of the Basin Plan prohibition language will eventually result in a scenario where the TMDL targets in water can change simply with approval of new analytical methods by U.S. EPA. Because it is not a defined numeric value, if incorporated into the TMDL, it may result in unintended consequences in the implementation phase of the TMDL. Additionally, it is fundamentally not a valid basis for a TMDL target (or for a water quality objective) because it is not related to beneficial use protection. Water Board staff suggested that because the language is in the Basin Plan, it needs to be incorporated into the TMDL targets, and that it can be interpreted as a numeric objective. Based on the Water Board’s response and the potential for “moving targets” in the implementation phase, it is recommended that stakeholders request (1) that the Water Board include an amendment of the language in the Basin Plan as part of the TMDL BPA, and/or (2) exclusion of prohibition language in setting TMDL targets.
- There are no averaging period, duration, or allowable excursion frequency components associated with the Basin Plan objectives. These components must be considered and incorporated into meaningful targets for TMDL implementation (e.g., the 12-month average concentration in water/sediment/tissue should not exceed XX µg/L or XX µg/kg more often than once per year). TMDL compliance targets for protection of human health should incorporate averaging periods, durations, and allowable excursion frequencies that are consistent with the lifetime exposures assumptions used to develop these criteria.
- In cases where there are multiple targets options applicable for a specific chemical, the most scientifically valid and robust target should apply, not the lowest number. In general, the process of target development and selection should be biased toward scientific validity and consistency of implementation, not simply the lowest published number available. It is not a requirement of the TMDL process to select the *lowest* available target for implementation.
- CTR water column criteria for protection of aquatic life are appropriate targets for direct toxic effects from OC pesticides. CTR criteria for the protection of human health are “back-calculated” from fish tissue values that precede and are not consistent with the more recently derived fish tissue values from OEHHHA. They are calculated using bioconcentration factors (BCFs) derived empirically or from simple chemical models, and are therefore not directly linked to human health beneficial uses as are fish tissue values. The real relationship between water column and sediment concentrations and the accumulation of toxics in fish tissue depends on a variety of species-specific and site-specific factors (sediment organic

content, complexity of the food web, species-specific feeding habits, home range, and lipid content), many of which vary with age and season. An estimate of human health risk from water column or sediment concentrations would also require accurate estimates of prey consumption rates, which are also regionally specific and species-specific. Consequently, a valid linkage analysis would be very complex and data intensive, and a simplistic empirical linkage between water or sediment concentrations and fish tissue will have a high degree of uncertainty. Either method is likely to result in a situation in which fish tissue targets directly connected to the beneficial use are achieved, but water column targets back-calculated from valid fish tissue targets are not. Addressing the uncertainty in water column targets with additional safety factors would make this problem worse. Based on these inherent limitations, it is recommended that water column concentrations calculated for protection of human health should be used to guide and prioritize management actions in the TMDL instead of as targets for compliance. This approach would keep the TMDL focus on achieving the beneficial uses of concern, and would avoid TMDL non-compliance if the beneficial uses are restored (i.e., fish targets are achieved) and the water-tissue relationship is not accurate.

Fish

Alternatives identified for setting potential fish tissue targets were Screening Values (SVs) and Fish Contaminant Goals (FCGs) developed by OEHHA (1999 and 2008, respectively), Tissue Threshold Residue Limits (TTRLs), or Advisory Tissue Levels (ATLs) developed by OEHHA (2008). The basis for fish tissue targets identified by Water Board staff as preferred for the TMDL were the FCGs developed and published by OEHHA, with 1999 SVs filling in for chemicals that were not updated in 2008. The basis for the FCGs and SVs is discussed in the Supplemental Information for Preliminary BPA document provided for the meeting.

Comments on Fish Tissue Concentration Targets:

- Within the preferred option, the basis for the SVs and FCGs is not consistent. They are based on different assumptions for fish consumption rates, risk levels (10^{-5} and 10^{-6} incremental cancer risk levels), and cooking reduction factors. The 2008 OEHHA FCGs update some of the 1999 SVs, but not all of the chemicals of concern. The main problem with this approach is it would result in different levels of protection for different chemicals. There are two options that should be considered for consistent implementation of the TMDL: (1) use only the 1999 SVs which provide a more complete set of targets, or (2) use the OEHHA methodology to estimate FCG targets for the chemicals of concern that were not updated in 2008. The principal choice that needs to be made is the level of desired protection. An additional option would be to use the OEHHA methodology at a different level of protection than used for the 2008 update of FCGs.
- TTRLs (the second option) are back-calculated from CTR criteria which are in turn back-calculated from fish tissue concentrations using literature-derived BCFs. The underlying fish tissue concentrations are based on data and assumptions that are not as recent and robust as the OEHHA SVs and FCGs. The uncertainty of the BCFs used to derive the CTR water column criteria are discussed above. This option should not be considered a viable alternative basis for TMDL targets.

Sediment

The preferred basis identified by Water Board staff for establishing TMDL targets for sediment is to use Sediment Quality Objectives (SQOs) from the Water Quality Control Plan for Enclosed Bays and Estuaries of California established for Delta waterways, and to develop SQOs for inland surface waters through a linkage analysis. Two additional options were identified: (1) to calculate sediment targets based on “Biota-Sediment Accumulation Factors” (BSAFs), and (2) use freshwater Toxic Effect Level (TEL) sediment quality guidelines published by NOAA.

Comments on Sediment Concentration Targets:

- The Water Board’s identified preferred option relies on development of SQOs for the Delta that is unlikely to be completed and approved in the time frame identified for the TMDL. This does not appear to be a viable option.
- Part B of the preferred option requires a complex linkage analysis relating sediment concentrations to fish tissue targets. Since Delta SQOs would not be available, this process would require development of sediment targets for the Delta and inland surface waters. Consequently, it would be redundant with the major effort already underway to develop SQOs for the Delta. This does not appear to be a fiscally responsible or viable alternative, given the current budget challenges for California. Additionally, it seems unlikely that the TMDL process could develop scientifically valid SQOs any faster than the process already underway for the Delta.
- The linkage analysis required for Part B of the preferred option has the same problems discussed previously for water column targets. That is, a valid linkage analysis will be very complex and data intensive, and a simplistic empirical linkage between water or sediment concentrations and fish tissue will have a high degree of uncertainty. Addressing the uncertainty with “safety factors” would increase the potential for disagreement in compliance status indicated by sediment targets and fish tissue targets that are directly connected to the beneficial use. As recommended for water column concentrations, sediment concentrations can best be used to guide TMDL management actions, instead of developing redundant surrogate targets for fish tissue and associated beneficial uses.
- Option 2 (BSAFs) is a simple chemically based calculation. As such it may provide a means to calculate initial sediment quality *guidelines* for the TMDL. Otherwise this alternative and Option 4 (TELs) have the same limitation of being surrogate targets that are less directly connected to the beneficial use of concern than fish tissue concentrations, and have the additional problem of being based on older assumptions for acceptable fish tissue concentrations than the OEHHA FCGs and SVs.
- An assumption that proportional reductions in tissue concentrations will result from reductions in sediment concentrations is very simplistic and may not be valid (see previous comments on the linkage of water and sediment concentrations to tissue concentrations). As stated previously, this method may provide an appropriate starting point for estimating reductions needed in sediment concentrations, but should not be used as a means of generating targets for assessing TMDL compliance.

Summary of Significant Comments/Concerns

The following is a summary of significant comments on the proposed TMDL process and target development to date.

- General Comment: Sequential development of the different TMDL elements with stakeholder input seems like a positive and reasonable approach. One concern with the approach and schedule is the short time available to evaluate and develop comments for some of the more technically complex elements of the TMDL (e.g., targets, linkage analysis, implementation).
- Provide additional clarification of the definition of “Background Sources” in future TMDL documents and Basin Plan Amendment text.
- The Basin Plan narrative detection prohibition is not a rational basis for the TMDL or potential targets because it is not connected to beneficial uses and doesn’t provide stable “implementable” TMDL targets. The narrative prohibition language in the Basin Plan should be modified as part of the BPA, or the existing BP language should not be used for TMDL target development. If policy lags behind well-established science and available technology, it makes sense to update the policy instead of ignoring the science.
- The TMDL compliance targets should be as directly linked to the beneficial uses as possible. For most OC pesticides, this is a fish tissue concentration. Except in cases of direct toxic effects on aquatic organisms, water and sediment concentrations in most cases would only be less direct and highly uncertain surrogate targets for beneficial uses related to human health. Based on the limitations of water and sediment-based targets, it is recommended that TMDL compliance targets to protect human health be constrained to fish tissue concentrations, and that water and sediment concentrations be used primarily as *guidelines* for TMDL management actions and decisions and not as targets to assess TMDL compliance.
- A consistent basis for fish tissue target and water or sediment guidelines should be considered and preferred for consistency of implementation (e.g., Fish tissue SVs versus FCGs for different compounds, or sediment SQOs vs linkage-based concentrations for different project areas).
- Target development and implementation should consider appropriate averaging periods and allowable frequencies of excursion for implementation of targets, particularly when the most sensitive beneficial use is human health and TMDL targets are based on lifetime exposures.
- Assumption of proportional reductions in sediment and OC pesticides may not be valid (see discussion) and should be evaluated in the upcoming linkage analysis.
- Although implementation alternatives will be addressed in a future module, they should be considered while evaluating alternatives throughout the TMDL process.